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Preoperative optimization of the liver for resection in patients with hilar cholangiocarcinoma

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Abstract
Optimal preoperative preparation is required to reduce operative risk of major hepatectomy in jaundiced patients. The role of percutaneous preoperative biliary drainage (PTBD) is, apart from assessment of intraductal extent of the tumour, to allow contralateral hypertrophy if portal vein embolization (PVE) is performed. The increased use of PTBD over a 10-year period was associated with increased resectability rate in this study, while PTBD-related complications decreased. Efficient hypertrophy of the future liver remnant (FLR) requires biliary drainage to reduce the risk of postoperative liver dysfunction. Preoperative staging laparoscopy avoided unnecessary surgical exploration in 20% of patients previously considered resectable.

Introduction

Hilar cholangiocarcinoma (HCCC) is usually diagnosed when the patient is jaundiced, indicating that the right and left bile duct are involved at their confluence. HCCC, which is often an infiltrating tumour, is difficult to manage surgically because of frequent involvement of the portal vein, the hepatic artery and/or the parenchyma of the liver around the hepatic hilum. Complete tumour clearance allowing long-term survival rates necessitates extensive hepatic resection, which is risky in jaundiced patients. Therefore, an appropriate preoperative preparation is required to reduce operative risk of major hepatectomy in jaundiced patients.

In this article, we describe our strategy for major hepatectomy for HCCC, focusing on preoperative treatment such as biliary drainage, portal vein embolization (PVE) and laparoscopic staging.

Preoperative percutaneous transhepatic biliary drainage (PTBD)

Several reports showed that liver resection in patients with complete obstructive jaundice and cholangitis is associated with severe complications, including intraoperative bleeding, postoperative subphrenic abscesses due to biliary fistula and liver failure [1]. The roles of percutaneous preoperative biliary drainage (PTBD) are: (a) to decrease bilirubin level, (b) to treat biliary infection, (c) to obtain better assessment of intraductal extent of carcinoma and (d) to allow hypertrophy if PVE is performed. However, PTBD also has adverse effects including risks of: (a) tumour seeding, (b) bleeding due to hepatic puncture, (c) infection and (d) prolongation of hospital stay. Although in all controlled studies, very few patients underwent liver resection, the advantage of preoperative PTBD was not demonstrated [2,3]. It is likely that a patient with early jaundice can tolerate major hepatectomy without preoperative biliary drainage. Results of Japanese series showed that preoperative biliary drainage increased both resectability and tolerance after hepatectomy [4,5]. Therefore, for 10 years we have followed the Japanese strategy of using preoperative PTBD. As shown in Table I, the increased use of PTBD in our institution was associated with an increased rate of resectability with vascular reconstruction, while the rate of complications decreased as we gained more experience with this procedure.

Diverse procedures for preoperative biliary drainage have been debated. Although successful plastic endoscopic retrograde biliary drainage (ERBD) may achieve efficient drainage with low morbidity and a shorter hospital stay, this procedure is rarely feasible in patients with complete obstruction with involvement of secondary biliary ducts [6]. The high quality of images provided by magnetic resonance imaging (MRI) and technical improvement with refined catheters may increase the indications for ERBD.

There are two approaches to performing PTBD, either unilateral or bilateral. We tend to perform

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Table I. Beaujon Hospital's experience with preoperative PTBD for HCCC.

	1992–1995 ($n=31$)	1995–2001 ($n=37$)
PTBD present	12 (39%)	26 (70%)
HCCC resectable	10 (32%)	22 (59%)
Vascular reconstruction	2 (20%)	8 (36%)
Procedures or complications of PTBD		
• More than 4 weeks drainage	6 (50%)	20 (77%)
• More than two drains	3 (25%)	18 (70%)
• Haemobilia	3 (25%)	2 (77%)
• Infectious complications	7 (60%)	5 (20%)

unilateral PTBD of the future liver remnant (FLR). When segmental cholangitis cannot be controlled after technically successful hemihepatic biliary drainage, additional biliary drainage is performed to drain the septic territory [5]. MRI permits excellent visualization of hepatic parenchymal abnormalities, as well as visualization of the biliary tree and vascular structures [7]. Because MRI is non-invasive and does not involve exposure to radiation, it may replace CT, angiography and cholangiography via PTBD.

Preoperative portal vein embolization (PVE)

The purpose of PVE is to initiate compensatory hypertrophy of the FLR and thus minimize post-operative liver dysfunction and liver failure. In patients considered for right hepatectomy with FLR $<40\%$ of the total liver, right PVE is indicated [8]. Efficient hypertrophy of the FLR requires biliary drainage, therefore PVE is performed when the bilirubin level has decreased to $<50\,\mu$mol/L. PVE is not indicated when a portal vein is involved by the tumour and in patients requiring a central hepatectomy.

Preoperative staging laparoscopy

It usually takes over 4 weeks for jaundice to resolve by PTBD, and sufficient hypertrophy of FLR after PVE takes an additional 2 weeks. Unresectable HCCC can be discovered at the time of exploration despite extensive preoperative evaluation including CT scan, ultrasonography, cholangio-MRI and cholangiography via PTBD. Peritoneal carcinomatosis and/or small intrahepatic metastases are not detectable with conventional preoperative evaluation [9]. Therefore we perform staging laparoscopy before starting the above preoperative preparation. Staging laparoscopy which is not useful for detection of vascular involvement led us to discover peritoneal and distant metastasis in up to 20% of patients initially deemed resectable. This policy led us to shorten the hospital stay and to treat these patients rapidly and efficiently with metallic stents.

References

[1] Cherqui D, Benoist S, Malassagne B, Humeres R, Rodriguez V, Fagniez PL. Major liver resection for carcinoma in jaundiced patients without preoperative biliary drainage. Arch Surg. 2000; 135:302–8.

[2] Hatfield ARW, Terblanche J, Fataar S, Kernoff L, Tobias R, Girdwood AH, et al. Preoperative external biliary drainage in obstructive jaundice: a prospective controlled clinical trial. Lancet 1982;2:896–9.

[3] McPherson GAD, Benjamin IS, Hodgson HJF, Bowley NB, Allison DJ, Blumgart LH. Pre-operative percutaneous transhepatic biliary drainage: the results of a controlled trial. Br J Surg 1984;71:371–5.

[4] Ebata T, Nagino M, Kamiya J, Uesaka K, Nagasaka T, Nimura Y. Hepatectomy with portal vein resection for hilar cholangiocarcinoma: audit of 52 consecutive cases. Ann Surg 2003; 238:720–7.

[5] Seyama Y, Kubota K, Sano K, Noie T, Takayama T, Kosuge T, et al. Long-term outcome of extended hemihepatectomy for hilar bile duct cancer with no mortality and high survival rate. Ann Surg 2003;238:73–83.

[6] Polydorou AA, Cairns SR, Dowsett JF, Hatfield AR, Salmon PR, Cotton PB, et al. Proximal malignant biliary obstruction by endoscopic endoprosthesis insertion. Gut 1991;32:685–9.

[7] De Groen PC, Gores GJ, LaRusso NF, Gunderson LL, Nagorney DM. Biliary tract cancers. N Engl J Med. 1999;341: 1368–77.

[8] Weber SM, DeMatteo RP, Fong Y, Blumgart LH, Jarnagin WR. Portal vein embolization before right hepatectomy: prospective clinical trial. Ann Surg. 2003;237:208–17.

[9] Weber SM, DeMatteo RP, Fong Y, Blumgart LH, Jarnagin WR. Staging laparoscopy in patients with extrahepatic biliary carcinoma. Analysis of 100 patients. Ann Surg 2002;235:392–9.